SECTION 16471

TRANSIENT VOLTAGE SURGE SUPPRESSION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This specification describes requirements for the Transient Voltage Surge Suppression (TVSS) devices for the protection of all AC electrical circuits from the effects of lightning induced currents, substation switching transients and internally generated transients resulting from inductive and/or capacitive load switching. The TVSS devices shall be suitable for application in Category B3 environment as described in ANSI/IEEE C62.41.

B. TVSS devices shall be provided as required by the application. Where provided TVSS devices shall comply with the requirements of this section.

1.2 SPECIAL REQUIREMENTS

A. TVSS devices shall be integral to the panelboard they protect. The TVSS shall be installed, delivered, and warranteed by the electrical distribution equipment manufacturer at the factory.

1.3 WARRANTY

A. The TVSS shall have a warranty period of five years, incorporating unlimited replacements of suppressor parts if transients destroy them during the warranty period.

1.4 CODES AND STANDARDS

A. U.L. compliance and labeling: Each complete suppression device shall be listed per U.L. 1449 (second edition) as a transient voltage surge suppressor.

B. TVSS shall be designed to allow installation in accordance with current National Electrical Code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers include: Advanced Protection Technologies, Liebert, Current Technology, or approved equal. The manufacturer shall be regularly engaged in the manufacture of TVSS devices for ANSI C62.41 B and C exposure categories for at least five years.

B. Where TVSS devices are specified as an integral part of distribution equipment, the manufacturer of the TVSS device shall be partnered with the distribution equipment manufacturer in providing a UL listed device.

2.2 TVSS DEVICES GENERAL

A. TVSS shall be compatible with the electrical system voltage, current, configuration and intended application.

B. TVSS shall be parallel in design.

C. TVSS shall be modular in design. Each suppression element shall be a user replaceable surge current diversion module (MOV based). Each surge current diversion module shall be fused with 200,000 AIR rated fuses. Provide one spare module for each unit.

D. TVSS shall have a maximum continuous operation voltage (MCOV) not less than 115 percent of the nominal RMS voltage continuously without degradation. For example, devices that use 130V MOVs for 120V systems are not acceptable.

E. TVSS shall have a minimum EMI/RFI filtering of -50dB at 100kHz with an insertion ratio of 50:1 using MIL STD. 220A methodology.

F. TVSS shall provide both visual and audible indication of properly performing protection for each phase.

G. TVSS shall provide full cycle tracking circuitry to provide tight transient clamping regardless of the transient position on the sine wave.

H. TVSS modules shall be fused and TVSS shall be capable of safely interrupting the power system's available fault current.

I. TVSS shall incorporate a low impedance surge diversion platform for the surge current path. The surge current shall be symmetrically disbursed to all suppression elements to insure equal stressing and maximum performance of the suppression elements. The surge diversion platform shall provide equal impedance paths to each suppression element for shunting of high frequency surges. The surge current diversion modules shall be bolted directly to the platform to insure reliable low impedance connections. Small gauge round wiring or plug-in connections shall not be used in the path for surge current diversion.

J. TVSS shall have remote monitoring capability.

K. TVSS shall have summary alarm form C relay contacts.

L. A transient counter shall be provided with the TVSS. Transient counter shall utilize a lithium battery to provide power to the counter in the event of a power failure.

2.3 BRANCH PANELBOARD TVSS DEVICES

A. TVSS shall be tested against ANSI C62.41 Category B3 impulse and Category B3 ringwave transients.

B. TVSS shall be capable of surviving 5000 sequential ANSI C62.41 B3 impulses, without failure or degradation of UL 1449 suppressed voltage rating by more than 10 percent.

C. TVSS shall have a maximum single impulse current rating of 160,000 amps per phase.

D. TVSS shall have a U.L. 1449 suppressed voltage rating (SVR) or clamp rating as follows: 400 volts (L-N and N-G) for 120/208 volt systems; 800 volts (L-N and N-G) for 277/480 volt systems.

E. TVSS shall provide protection in the following modes:

Three Phase Wye
line-to-neutral (L-N)
neutral-to-ground (N-G)

F. Provide overcurrent protection and a means of disconnect for the TVSS. Overcurrent and disconnect devices shall be exclusively utilized for TVSS. Size overcurrent protection in accordance with manufacturer's recommendations.

2.4 TVSS DEVICES INTEGRAL TO DISTRIBUTION EQUIPMENT

A. TVSS shall be Component Recognized in accordance with UL 1449, Standard for Safety, Transient Voltage Surge Suppressors.

B. The TVSS diagnostic monitoring devices shall be mounted on the front of the distribution equipment enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide TVSS devices integral to panels in accordance with Section 16470 - Panelboards. Where TVSS devices are provided as an integral part of the distribution equipment, they shall be installed as follows:

1. TVSS shall be installed by and shipped from the electrical distribution equipment manufacturer’s factory.

END OF SECTION